

METHOD OF FORMING A READ SENSOR USING A LIFT-OFF MASK HAVING A
HARDMASK LAYER AND A RELEASE LAYER

ABSTRACT OF THE DISCLOSURE

5 A method of forming a read sensor that has a very narrow track width is disclosed. The method involves forming a thin lift-off mask over a central region of a sensor layer, which is subsequently ion-milled and deposited with hard bias and lead layers. The thin lift-off mask is made by forming a release layer over the sensor layer; forming a hardmask layer over the release layer; forming a photoresist layer over the hardmask layer; imaging and developing the photoresist layer such that end portions of the photoresist layer are removed and a central portion of the photoresist layer remains; reactive ion etching (RIE) the hardmask layer such that end portions of the hardmask layer are removed and a central portion of the hardmask layer remains; stripping the central portion of the photoresist layer; and etching the release layer such that end portions of the release layer are removed and a central portion of the release layer remains. The hardmask layer may be made from a highly-etch-resistant material, such as silicon, titanium, or tantalum. The release layer may be made from, e.g., polydimethylglutarimide (PMGI) which may be RIE'd, or a metal (such as AlCu) which may be wet-etched. Using this method, shadowing can be minimized and undercut size can be sufficiently controlled for defining narrow track widths.

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